**IN THE CLAIMS**:

Kindly amend the claims, as follows:

1. (Original) A data transmission system for transmitting user data to and receiving data from a communication channel, comprising:

a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

a linear block encoder to encode the user data in response to said parity check matrix;

a transmitter to transmit an output of said linear block encoder to the communication channel;

a soft channel decoder to decode data; and

a soft linear block code decoder to decode data decoded by said soft channel decoder in response to said parity check matrix.

2. (Original) A data transmission system according to Claim 1, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

3. (Original) A data transmission system according to Claim 2, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

4. (Original) A data transmission system according to Claim 2, wherein said M

tiers are arranged in increasing rank order.

5. (Original) A data transmission system according to Claim 4, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

6. (Original) A data transmission system according to Claim 2, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

7. (Original) A data transmission system according to Claim 6, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

8. (Original) A data transmission system according to Claim 2, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

9. (Original) A data transmission system according to Claim 2, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

10. (Original) A data transmission system according to Claim 4, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \leq r \leq \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{matrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{matrix} \right\}$$

$$0 \leq c \leq C$$

$$C \leq P_1 * P_2$$

11. (Currently Amended) A data transmission system according to Claim 4, wherein M=3, the number of rows = $P_1 + P_2 + P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

12. (Currently Amended) A data transmission system according to Claim 11, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

13. (Original) A data transmission system according to Claim 1, wherein said linear block code encoder comprises a low-density parity-check encoder and wherein said soft linear block code decoder comprises a low-density parity-check decoder.

14. (Original) A data transmission system according to Claim 1, wherein said soft channel decoder comprises a soft Viterbi algorithm decoder.

15. (Original) A decoder for decoding data from a communication channel, comprising:

a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

a soft channel decoder to decode data; and

a soft linear block code decoder to decode data decoded by said soft channel decoder in accordance with said parity check matrix.

16. (Original) A decoder according to Claim 15, wherein each of said M tiers

comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

17. (Original) A decoder according to Claim 16, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

18. (Original) A decoder according to Claim 16, wherein said M tiers are arranged in increasing rank order.

19. (Original) A decoder according to Claim 18, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

20. (Original) A decoder according to Claim 16, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

21. (Original) A decoder according to Claim 20, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

22. (Original) A decoder according to Claim 16, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

23. (Original) A decoder according to Claim 16, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

24. (Original) A decoder according to Claim 18, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

25. (Currently Amended) A decoder according to Claim 18, wherein M=3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

26. (Currently Amended) A decoder according to Claim 25, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

27. (Original) A decoder according to Claim 15, wherein said linear block code encoder comprises a low-density parity-check encoder and wherein said soft linear block code decoder comprises a low-density parity-check decoder.

~~26~~ 28. (Currently Amended) A decoder according to Claim 15, wherein said soft channel decoder comprises a soft Viterbi algorithm decoder.

~~27~~ 29. (Currently Amended) An encoder for encoding data from a communication channel, comprising:

a parity check matrix comprising:

M tiers,

wherein M ≥ 2,

Dmin = 2 * M for M = 1..3 or

2*M ≥ Dmin ≥ 6 for M > 3,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

a linear block encoder to encode the user data in response said parity check matrix; and

a transmitter to transmit an output of said linear block encoder to the communication channel.

~~28~~ 30. (Currently Amended) An encoder according to Claim ~~27~~ 29, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~29~~ 31. (Currently Amended) An encoder according to Claim ~~28~~ 30, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~30~~ 32. (Currently Amended) An encoder according to Claim ~~28~~ 30, wherein said M tiers are arranged in increasing rank order.

~~31~~ 33. (Currently Amended) An encoder according to Claim ~~30~~ 32, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~32~~ 34. (Currently Amended) An encoder according to Claim ~~28~~ 30, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~33~~ 35. (Currently Amended) An encoder according to Claim ~~32~~ 34, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~34~~ 36. (Currently Amended) An encoder according to Claim ~~28~~ 30, wherein said

matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~35~~ 37. (Currently Amended) An encoder according to Claim ~~28~~ 30, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~36~~ 38. (Currently Amended) An encoder according to Claim ~~30~~ 32, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \begin{Bmatrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{Bmatrix}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~37~~ 39. (Currently Amended) An encoder according to Claim ~~30~~ 32, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~38~~ 40. (Currently Amended) An encoder according to Claim ~~37~~ 39, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~39~~ 41. (Currently Amended) An encoder according to Claim ~~27~~ 29, wherein said linear block code encoder comprises a low-density parity-check encoder and wherein said soft linear block code encoder comprises a low-density parity-check encoder.

~~40~~ 42. (Currently Amended) An encoder according to Claim ~~27~~ 29, wherein said soft channel encoder comprises a soft Viterbi algorithm encoder.

~~41~~ 43. (Currently Amended) A parity check matrix embodied in a medium for one of a low-density parity-check encoder and a low-density parity-check decoder, comprising:

M tiers,

wherein $M \geq 2$,

$Dmin = 2 * M$ for $M = 1..3$ or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

$tc = M$,

wherein tc is the column weight, and

cycle - 4 = 0.

~~42~~ 44. (Currently Amended) A parity check matrix according to Claim ~~41~~ 43, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~43~~ 45. (Currently Amended) A parity check matrix according to Claim ~~42~~ 44, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

[[44]] 46. (Currently Amended) A parity check matrix according to Claim ~~42~~ 44, wherein said M tiers are arranged in increasing rank order.

~~45~~ 47. (Currently Amended) A parity check matrix according to Claim [[44]] 46, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~46~~ 48. (Currently Amended) A parity check matrix according to Claim ~~42~~ 44, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~47~~ 49. (Currently Amended) A parity check matrix according to Claim ~~46~~ 48,

wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~48~~ 50. (Currently Amended) A parity check matrix according to Claim ~~42~~ 44, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~49~~ 51. (Currently Amended) A parity check matrix according to Claim ~~42~~ 44, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~50~~ 52. (Currently Amended) A parity check matrix according to Claim [[44]] 46, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \begin{Bmatrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{Bmatrix}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~51~~ 53. (Currently Amended) A parity check matrix according to Claim [[44]] 46, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~52~~ 54. (Currently Amended) A parity check matrix according to Claim ~~51~~ 53, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~53~~ 55. (Currently Amended) A data transmission system for transmitting user data to and receiving data from a communication channel, comprising:

a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

linear block encoding means for encoding the user data in response to said parity check matrix;

transmitting means for transmitting an output of said linear block encoding means to the communication channel;

soft channel decoding means for decoding data; and

soft linear block code decoding means for decoding data decoded by said soft channel decoding means in response to said parity check matrix.

~~54~~ 56. (Currently Amended) A data transmission system according to Claim ~~53~~ 55, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~55~~ 57. (Currently Amended) A data transmission system according to Claim ~~54~~ 56, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~56~~ 58. (Currently Amended) A data transmission system according to Claim ~~54~~ 56, wherein said M tiers are arranged in increasing rank order.

~~57~~ 59. (Currently Amended) A data transmission system according to Claim ~~56~~ 58, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~58~~ 60. (Currently Amended) A data transmission system according to Claim ~~54~~ 56, wherein said matrix comprises R rows, wherein R = $\sum_{i=1}^{M} P_i$.

~~59~~ 61. (Currently Amended) A data transmission system according to Claim ~~58~~ 60, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~60~~ 62. (Currently Amended) A data transmission system according to Claim ~~54~~ 56, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~61~~ 63. (Currently Amended) A data transmission system according to Claim ~~54~~ 56, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~62~~ 64. (Currently Amended) A data transmission system according to Claim ~~56~~ 58, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \begin{Bmatrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{Bmatrix}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~63~~ 65. (Currently Amended) A data transmission system according to Claim ~~56~~ 58, wherein M=3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~64~~ 66. (Currently Amended) A data transmission system according to Claim ~~63~~ 65,

wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~65~~ 67. (Currently Amended) A data transmission system according to Claim ~~53~~ 55, wherein said linear block code encoding means comprises a low-density parity-check encoding means and wherein said soft linear block code decoding means comprises a low-density parity-check decoding means.

~~66~~ 68. (Currently Amended) A data transmission system according to Claim ~~53~~ 55, wherein said soft channel decoding means comprises a soft Viterbi algorithm decoding means.

~~67~~ 69. (Currently Amended) A decoder for decoding data from a communication channel, comprising:

a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

soft channel decoding means for decoding data; and

soft linear block code decoding means for decoding data decoded by said soft channel decoding means in accordance with said parity check matrix.

~~68~~ 70. (Currently Amended) A decoder according to Claim ~~67~~ 69, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~69~~ 71. (Currently Amended) A decoder according to Claim ~~68~~ 70, wherein the rank

of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~70~~ 72. (Currently Amended) A decoder according to Claim ~~68~~ 70, wherein said M tiers are arranged in increasing rank order.

~~71~~ 73. (Currently Amended) A decoder according to Claim ~~70~~ 72, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~72~~ 74. (Currently Amended) A decoder according to Claim ~~68~~ 70, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~73~~ 75. (Currently Amended) A decoder according to Claim ~~72~~ 74, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~74~~ 76. (Currently Amended) A decoder according to Claim ~~68~~ 70, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~75~~ 77. (Currently Amended) A decoder according to Claim ~~68~~ 70, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~76~~ 78. (Currently Amended) A decoder according to Claim ~~70~~ 72, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~77~~ 79. (Currently Amended) A decoder according to Claim ~~70~~ 72, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~78~~ 80. (Currently Amended) A decoder according to Claim ~~77~~ 79, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~79~~ 81. (Currently Amended) A decoder according to Claim ~~67~~ 69, wherein said linear block code encoding means comprises a low-density parity-check encoding means and wherein said soft linear block code decoding means comprises a low-density parity-check decoding means.

~~80~~ 82. (Currently Amended) A decoder according to Claim ~~67~~ 69, wherein said soft channel decoding means comprises a soft Viterbi algorithm decoding means.

~~81~~ 83. (Currently Amended) An encoder for encoding data from a communication channel, comprising:

a parity check matrix comprising:

M tiers,

wherein M ≥ 2,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

$tc = M$,

wherein tc is the column weight, and

cycle - 4 = 0;

linear block encoding means for encoding the user data in response said parity check matrix; and

transmitting means for transmitting an output of said linear block encoding means to the communication channel.

~~82~~ 84. (Currently Amended) An encoder according to Claim ~~81~~ 83, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~83~~ 85. (Currently Amended) An encoder according to Claim ~~82~~ 84, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~84~~ 86. (Currently Amended) An encoder according to Claim ~~82~~ 84, wherein said M tiers are arranged in increasing rank order.

~~85~~ 87. (Currently Amended) An encoder according to Claim ~~84~~ 86, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~86~~ 88. (Currently Amended) An encoder according to Claim ~~82~~ 84, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~87~~ 89. (Currently Amended) An encoder according to Claim ~~86~~ 88, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~88~~ 90. (Currently Amended) An encoder according to Claim ~~82~~ 84, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~89~~ 91. (Currently Amended) An encoder according to Claim ~~82~~ 84, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~90~~ 92. (Currently Amended) An encoder according to Claim ~~84~~ 86, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~91~~ 93. (Currently Amended) An encoder according to Claim ~~84~~ 86, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~92~~ 94. (Currently Amended) An encoder according to Claim ~~91~~ 93, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~93~~ 95. (Currently Amended) An encoder according to Claim ~~81~~ 83, wherein said linear block code encoding means comprises a low-density parity-check encoding means and wherein said soft linear block code encoding means comprises a low-density parity-check encoding means.

~~94~~ 96. (Currently Amended) An encoder according to Claim ~~81~~ 83, wherein said soft channel encoding means comprises a soft Viterbi algorithm encoding means.

~~95~~ 97. (Currently Amended) A method for transmitting data to and receiving data from a communication channel, comprising the steps of:

(a) generating a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

(b) linear block encoding the data in accordance with the parity check matrix generated in step (a);

(c) transmitting the data encoded in step (b) to the communication channel;

(d) receiving the data from [[to]] the communication channel;

(e) soft channel decoding the data read in step (d) in accordance with data decoded in step (g);

(f) generating an address in accordance with the data soft linear block code decoding the data decoded in step (e); and

(g) soft linear block code decoding data decoded by in step (e) in accordance with the address generated in step(f).

~~96~~ 98. (Currently Amended) A method according to Claim ~~95~~ 97, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~97~~ 99. (Currently Amended) A method according to Claim ~~96~~ 98, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said

identity matrix of another one of said tiers.

~~98~~ 100. (Currently Amended) A method according to Claim ~~96~~ 98, wherein said M tiers are arranged in increasing rank order.

~~99~~ 101. (Currently Amended) A method according to Claim ~~98~~ 100, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~100~~ 102. (Currently Amended) A method according to Claim ~~96~~ 98, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~101~~ 103. (Currently Amended) A method according to Claim ~~100~~ 102, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~102~~ 104. (Currently Amended) A method according to Claim ~~96~~ 98, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~103~~ 105. (Currently Amended) A method according to Claim ~~96~~ 98, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~104~~ 106. (Currently Amended) A method according to Claim ~~98~~ 100, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~105~~ 107. (Currently Amended) A method according to Claim ~~98~~ 100, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~106~~ 108. (Currently Amended) A method according to Claim ~~105~~ 107, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~107~~ 109. (Currently Amended) A method for decoding data received from a communication channel, comprising the steps of:

(a) soft channel decoding the data received from the communication channel in accordance with data decoded in step (c);

(b) generating a parity check matrix comprising:

M tiers,

wherein M ≥ 2,

Dmin = 2 * M for M = 1..3 or

2*M ≥ Dmin ≥ 6 for M > 3,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0; and

(c) soft linear block code decoding data decoded [[by]] in step (a) in accordance

with the matrix generated in step(b).

~~108~~ 110. (Currently Amended) A method according to Claim ~~107~~ 109, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~109~~ 111. (Currently Amended) A method according to Claim ~~108~~ 110, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~110~~ 112. (Currently Amended) A method according to Claim ~~108~~ 110, wherein said M tiers are arranged in increasing rank order.

~~111~~ 113. (Currently Amended) A method according to Claim ~~110~~ 112, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~112~~ 114. (Currently Amended) A method according to Claim ~~108~~ 110, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~113~~ 115. (Currently Amended) A method according to Claim ~~108~~ 114, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~114~~ 116. (Currently Amended) A method according to Claim ~~108~~ 110, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~115~~ 117. (Currently Amended) A method according to Claim ~~108~~ 110, wherein

said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~116~~ 118. (Currently Amended) A method according to Claim ~~110~~ 112, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~117~~ 119. (Currently Amended) A method according to Claim ~~110~~ 112, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~118~~ 120. (Currently Amended) A method according to Claim ~~117~~ 119, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~119~~ 121. (Currently Amended) A method for encoding data transmitted to a communication channel, comprising the steps of:

(a) generating a parity check matrix comprising:

M tiers,

wherein $M \ge 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \ge Dmin \ge 6$ for M > 3,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;[[;]]

(b) linear block encoding the data in accordance with the matrix generated in step (a); and

(c) transmitting the data encoded in step (b) to the communication channel.

~~120~~ 122. (Currently Amended) A method according to Claim ~~119~~ 121, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~121~~ 123. (Currently Amended) A method according to Claim ~~120~~ 122, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~122~~ 124. (Currently Amended) A method according to Claim ~~120~~ 122, wherein said M tiers are arranged in increasing rank order.

~~123~~ 125. (Currently Amended) A method according to Claim ~~122~~ 124, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~124~~ 126. (Currently Amended) A method according to Claim ~~120~~ 122, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~125~~ 127. (Currently Amended) A method according to Claim ~~124~~ 126, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~126~~ 128. (Currently Amended) A method according to Claim ~~120~~ 122, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~127~~ 129. (Currently Amended) A method according to Claim ~~120~~ 122, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~128~~ 130. (Currently Amended) A method according to Claim ~~122~~ 124, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~129~~ 131. (Currently Amended) A method according to Claim ~~122~~ 124, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~130~~ 132. (Currently Amended) A method according to Claim ~~129~~ 131, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~131~~ 133. (Currently Amended) A computer program embodied in a medium for transmitting data to and receiving data from a communication channel, comprising the steps of:

(a) generating a parity check matrix comprising:

M tiers,

wherein $M \ge 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \ge Dmin \ge 6$ for M > 3,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

(b) linear block encoding the data in accordance with the parity check matrix generated in step (a);

(c) transmitting the data encoded in step (b) to the communication channel;

(d) receiving the data from [[to]] the communication channel;

(e) soft channel decoding the data read in step (d) in accordance with data decoded in step (g);

(f) generating an address in accordance with the data soft linear block code decoding the data decoded in step (e); and

(~~h~~ g) soft linear block code decoding data decoded by in step (e) in accordance with the address generated in step(f).

~~132~~ 134. (Currently Amended) A computer program according to Claim ~~131~~ 133, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~133~~ 135. (Currently Amended) A computer program according to Claim ~~132~~ 134, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~134~~ 136. (Currently Amended) A computer program according to Claim ~~132~~ 134, wherein said M tiers are arranged in increasing rank order.

~~135~~ 137. (Currently Amended) A computer program according to Claim ~~134~~ 136, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~136~~ 138. (Currently Amended) A computer program according to Claim ~~132~~ 134, wherein said matrix comprises R rows, wherein $R = \sum_{i=1}^{M} P_i$.

~~137~~ 139. (Currently Amended) A computer program according to Claim ~~136~~ 138, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~138~~ 140. (Currently Amended) A computer program according to Claim ~~132~~ 134, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~139~~ 141. (Currently Amended) A computer program according to Claim ~~132~~ 134, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~140~~ 142. (Currently Amended) A computer program according to Claim ~~134~~ 136, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{array}{l} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{array} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~141~~ 143. (Currently Amended) A computer program according to Claim ~~134~~ 136, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns= P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~142~~ 144. (Currently Amended) A computer program according to Claim ~~131~~ 143, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~143~~ 145. (Currently Amended) A computer program embodied in a medium for

decoding data received from a communication channel, comprising the steps of:

(a) soft channel decoding the data received from the communication channel in accordance with data decoded in step (c);

(b) generating a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0; and

(c) soft linear block code decoding data decoded [[by]] in step (a) in accordance with the matrix generated in step(b).

~~144~~ 146. (Currently Amended) A computer program according to Claim ~~143~~ 145, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~145~~ 147. (Currently Amended) A computer program according to Claim ~~144~~ 146, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~146~~ 148. (Currently Amended) A computer program according to Claim ~~144~~ 146, wherein said M tiers are arranged in increasing rank order.

~~147~~ 149. (Currently Amended) A computer program according to Claim ~~146~~ 148, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~148~~ 150. (Currently Amended) A computer program according to Claim ~~144~~

146, wherein said matrix comprises R rows, wherein R = $\sum_{i=1}^{M} P_i$.

~~149~~ 151. (Currently Amended) A computer program according to Claim ~~148~~ 150, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~150~~ 152. (Currently Amended) A computer program according to Claim ~~144~~ 146, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~151~~ 153. (Currently Amended) A computer program according to Claim ~~144~~ 146, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~152~~ 154. (Currently Amended) A computer program according to Claim ~~146~~ 148, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \left\{ \begin{matrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{matrix} \right\}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~153~~ 155. (Currently Amended) A computer program according to Claim ~~146~~ 148, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~154~~ 156. (Currently Amended) A computer program according to Claim ~~153~~ 155, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~155~~ 157. (Currently Amended) A computer program embodied in a medium for encoding data transmitted to a communication channel, comprising the steps of:

(a) generating a parity check matrix comprising:

M tiers,

wherein $M \geq 2$,

Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

tc = M,

wherein tc is the column weight, and

cycle - 4 = 0;

(b) linear block encoding the data in accordance with the matrix generated in step (a); and

(c) transmitting the data encoded in step (b) to the communication channel.

~~156~~ 158. (Currently Amended) A computer program according to Claim ~~155~~ 157, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~157~~ 159. (Currently Amended) A computer program according to Claim ~~156~~ 158, wherein the rank of said identity matrix of one of said tiers is mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~158~~ 160. (Currently Amended) A computer program according to Claim ~~156~~ 158, wherein said M tiers are arranged in increasing rank order.

~~159~~ 161. (Currently Amended) A computer program according to Claim ~~158~~ 160, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~160~~ 162. (Currently Amended) A computer program according to Claim ~~156~~ 158, wherein said matrix comprises R rows, wherein R = $\sum_{i=1}^{M} P_i$.

~~161~~ 163. (Currently Amended) A computer program according to Claim ~~160~~ 162, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~162~~ 164. (Currently Amended) A computer program according to Claim ~~156~~ 158, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~163~~ 165. (Currently Amended) A computer program according to Claim ~~156~~ 158, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~164~~ 166. (Currently Amended) A computer program according to Claim ~~158~~ 160, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \begin{Bmatrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{Bmatrix}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~165~~ 167. (Currently Amended) A computer program according to Claim ~~158~~ 160, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~166~~ 168. (Currently Amended) A computer program according to Claim ~~165~~

167, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~167~~ 169. (Currently Amended) A method for generating a ~~method~~ parity check matrix for one of a low-density parity-check encoder and a low-density parity-check decoder, comprising the steps of:

providing M tiers of element,

wherein $M \geq 2$,

selecting Dmin = 2 * M for M = 1..3 or

$2*M \geq Dmin \geq 6$ for M > 3,

wherein Dmin is the minimum Hamming distance,

selecting tc = M,

wherein tc is the column weight, and

selecting cycle - 4 = 0.

~~168~~ 170. (Currently Amended) A method according to Claim ~~167~~ 169, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~169~~ 171. (Currently Amended) A method according to Claim ~~168~~ 170, further comprising the step of setting the rank of said identity matrix of one of said tiers to be mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~170~~ 172. (Currently Amended) A method according to Claim ~~168~~ 170, further comprising the step of arranging said M tiers in increasing rank order.

~~171~~ 173. (Currently Amended) A method according to Claim ~~170~~ 172, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~172~~ 174. (Currently Amended) A method according to Claim ~~168~~ 170, wherein

said matrix comprises R rows, wherein R = $\sum_{i=1}^{M} P_i$.

~~173~~ 175. (Currently Amended) A method according to Claim ~~172~~ 174, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~174~~ 176. (Currently Amended) A method according to Claim ~~168~~ 170, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~175~~ 177. (Currently Amended) A method according to Claim ~~168~~ 170, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~176~~ 178. (Currently Amended) A method according to Claim ~~170~~ 172, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \begin{Bmatrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{Bmatrix}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~177~~ 179. (Currently Amended) A method according to Claim ~~170~~ 172, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~178~~ 180. (Currently Amended) A method according to Claim ~~177~~ 179, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.

~~179~~ 181. (Currently Amended) A computer program embodied in a medium for generating a ~~computer program~~ parity check matrix for one of a low-density parity-check encoder and a low-density parity-check decoder, comprising the steps of:

providing M tiers of element,

wherein $M \geq 2$,

selecting Dmin = 2 * M for M=1..3 or

$2*M \geq Dmin \geq 6$ for $M > 3$,

wherein Dmin is the minimum Hamming distance,

selecting tc = M,

wherein tc is the column weight, and

selecting cycle - 4 = 0.

~~180~~ 182. (Currently Amended) A computer program according to Claim ~~179~~ 181, wherein each of said M tiers comprises an identity matrix having a corresponding rank $P_i$, wherein $1 \leq i \leq M$.

~~181~~ 183. (Currently Amended) A computer program according to Claim ~~180~~ 182, further comprising the step of setting the rank of said identity matrix of one of said tiers to be mutually prime with respect to the rank of said identity matrix of another one of said tiers.

~~182~~ 184. (Currently Amended) A computer program according to Claim ~~180~~ 182, further comprising the step of arranging said M tiers in increasing rank order.

~~183~~ 185. (Currently Amended) A computer program according to Claim ~~182~~ 184, wherein said matrix comprises C columns, wherein $C \leq P_1 * P_2$.

~~184~~ 186. (Currently Amended) A computer program according to Claim ~~180~~

182, wherein said matrix comprises R rows, wherein R = $\sum_{i=1}^{M} P_i$.

~~185~~ 187. (Currently Amended) A computer program according to Claim ~~184~~ 186, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ independent rows.

~~186~~ 188. (Currently Amended) A computer program according to Claim ~~180~~ 182, wherein said matrix comprises $\sum_{i=1}^{M} P_i - (M-1)$ parity bits.

~~187~~ 189. (Currently Amended) A computer program according to Claim ~~180~~ 182, wherein said matrix comprises $P_1 \times P_2 - \sum_{i=1}^{M} P_i + (M-1)$ maximum user bits.

~~188~~ 190. (Currently Amended) A computer program according to Claim ~~182~~ 184, wherein for each element $A_{r,c}$

$$For \sum_{j=1}^{n-1} P_j + 1 \le r \le \sum_{j=1}^{n} P_j,$$

$$A_{r,c} = \begin{Bmatrix} 1, if c \bmod(P_n) = r - \sum_{j=1}^{n-1} P_j \\ 0, otherwise \end{Bmatrix}$$

$$0 \le c \le C$$

$$C \le P_1 * P_2$$

~~189~~ 191. (Currently Amended) A computer program according to Claim ~~182~~ 184, wherein M = 3, the number of rows = $P_1+P_2+P_3$, the number of columns = P1 * P2, ~~dmin~~ Dmin = 6, and tc = 3.

~~190~~ 192. (Currently Amended) A computer program according to Claim ~~189~~ 191, wherein a code rate = $(P_1*P_2+P_1-P_2-P_3+2)/(P_1*P_2)$.